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FORM PTO-1082

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Express Mail EL 549 326 275 US  
PATENT  
Atty. Docket No. ULTRA-1001  
Date: October 2, 2000

## UTILITY PATENT APPLICATION TRANSMITTAL and FEE TRANSMITTAL

jc927 U.S. PTO  
09/678062  
10/02/00

Box PATENT APPLICATION  
COMMISSIONER FOR PATENTS  
Washington, D.C. 20231

Sir:  
Transmitted herewith for filing is the patent application of:

Inventor(s): Raymond W. Coles  
For: A METHOD OF FORMING AN IMAGE, AND TO A PRODUCT HAVING AN IMAGE FORMED THEREON

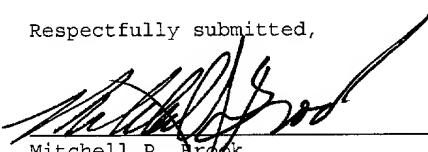
Enclosed are:

- Specification, Claims, and Abstract (9 pages)  
 3 Sheet(s) of drawing (       formal,  informal)  
 Form PTO-1595 and an assignment of the invention to: \_\_\_\_\_ Will follow.  
 A certified copy of \_\_\_\_\_ from which priority is claimed in the subject case pursuant to Rule 55b and 35 U.S.C. 119. \_\_\_\_\_ Will follow.  
 An associate Power of Attorney. \_\_\_\_\_ Will follow.  
 A verified statement to establish small entity status under 37 CFR 1.9 and 37 CFR 1.27. \_\_\_\_\_ Will follow.  
 Combined Declaration and Power of Attorney. \_\_\_\_\_ Will follow.  
 Information Disclosure Statement, Form PTO-1449, and \_\_\_\_\_ cited references  
 Postcard

| FOR:                                     | NO. FILED | In Excess | NO. EXTRA | SMALL ENTITY |      | LARGE ENTITY |           |
|--|-----------|-----------|-----------|--------------|------|--------------|-----------|
|  |           |           |           | RATE         | FEES | RATE         | FEES      |
| BASIC FEE                                |           |           |           | \$345.00     |      | OR           | \$690.00  |
| TOTAL CLAIMS                             | 20        | - 20      | = 0       | x \$ 9.00    |      | OR           | x\$ 18.00 |
| INDEP CLAIMS                             | 2         | - 3       | = 0       | x \$ 39.00   |      | OR           | x\$ 78.00 |
| PRESENTATION OF MULTIPLE DEPENDANT CLAIM |           |           |           | + \$130.00   |      | OR           | + 260.00  |
|  |           |           |           | TOTAL        |      | OR           | TOTAL     |
|  |           |           |           |              |      |              | \$ 690.00 |

- Check Number \_\_\_\_\_ in the amount of \$ 0.00 to cover the filing fee is enclosed.  
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Any patent application processing fees under 37 CFR 1.17.  
The issue fee set in 37 CFR 1.18 at or before mailing of the Notice of Allowance, pursuant to 37 CFR 1.311(b).  
Any filing fees under CFR 1.16 for presentation or extra claims.

Respectfully submitted,

  
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: ) Art Unit: Unknown  
Raymond W. COLES )  
Serial No.: TBA ) Examiner: Unknown  
Filed: October 2, 2000 )  
For: A METHOD OF FORMING AN )  
IMAGE, AND TO A PRODUCT )  
HAVING AN IMAGE FORMED )  
THEREON )

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October 2, 2000

BOX PATENT APPLICATION

Commissioner For Patents  
Washington, D.C. 20231

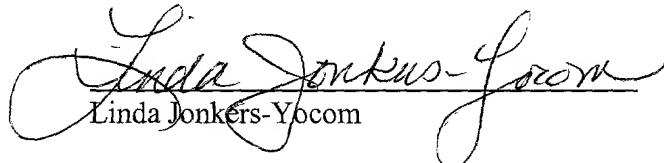
CERTIFICATE OF EXPRESS MAILING

Dear Sir:

“Express Mail” mailing label No. EL 549 326 275 US

Date of Deposit: October 2, 2000

I hereby certify that a Patent Application including the Specification, Abstract, and claims (9 pages), Formal Drawings (FIGS. 1-5 on 3 pages), Utility Patent Application Transmittal and Fee Transmittal (in duplicate), Combined Declaration for Patent Application and Power of Attorney (2 pages), and return postcard are being deposited with the U.S. Postal Service “Express Mail Post Office to the Addressee” service under 37 CFR § 1.10 on the date indicated above and is addressed to Box Utility Application, Commissioner for Patents, Washington, D.C. 20231.

  
Linda Jonkers-Yocom

Atty. Dkt. No. ULTRA-1001  
Express Mail No. EL 549 326 275 US

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**A METHOD OF FORMING AN IMAGE, AND TO A  
PRODUCT HAVING AN IMAGE FORMED THEREON**

**Inventor: Raymond W. Coles**

Patent Application  
Serial No. 10/123,456

P101524US/SAB

## A METHOD OF FORMING AN IMAGE, AND TO A PRODUCT HAVING AN IMAGE FORMED THEREON

The present invention relates to a method of forming an image, and to a product having an image formed thereon. In particular, this invention provides an enhanced security image.

WO96/30215 describes a method of forming an image on a surface of a card, and in particular the formation of a security card. In general terms, a plastics card is provided on to which an image and other data or markers is printed for example using a dye sublimation or dye diffusion printing process. Once printed, the image on the card is protected by laying down a thin transparent plastic coating. The plastic coating (hereinafter called "overcoat") is deposited by thermal transfer printing. Security images can also be formed in the overcoat by overheating portions of it, thereby changing the optical properties over the overcoat. In general, the overheated portions of the film take on a less glossy (i.e. matt or satin), appearance. Thus additional images confirming the authenticity of the card can be formed in the transparent layer, with the printed portion of the card being visible therethrough. The security images can be easily seen when the card is illuminated by a unidirectional light source, but are less clear when viewed in diffuse light.

According to a first aspect of the present invention, there is provided a method of forming an image, comprising providing a layer of plastics material over a substrate, the substrate having at least one reflective region thereon, and selectively altering the optical properties of portions of the plastics material so as to form an image therein.

It is thus possible to provide an improved security card. The applicant has discovered that the security markings become much more visible, even in diffuse light, when printed over a reflective region.

Advantageously the reflective region comprises a reflective film, such as a metallic film, or a film exhibiting mirror like reflection properties. The metal film may be printed on to the substrate. Thus a metal film may be provided on blank card stock at the time of manufacture of security cards. Alternatively, the reflective film may be printed onto the

card as part of the card printing process. Thus, for example, the metal film may be provided on a carrier film and be brought into contact with the substrate at a printing station in order to transfer the metal film to the substrate.

Preferably the layer of plastics film is provided on a carrier film. The carrier film may be brought into contact with the substrate at a printer having a plurality of heater elements. The heater elements may be energised in order to thermally transfer the plastics material from the carrier film to the substrate.

The heater elements may be energised at a plurality of energy levels in order to vary the thickness of the plastics film transferred. The varying thickness thereby resulting in a variable appearance of the film.

Alternatively, the heater elements may be energised to a first value in order to transfer the entirety of the thickness of the plastics film to the substrate, and selective ones of the heater elements may be energised to a second value in order to overwork or overheat the deposited film, thereby varying its optical properties. Thus the appearance of the overworked areas may be matt or satin, when compared to the other portions of the film.

The security image may be repeatedly printed across the card in a repeat and step like manner. However, advantageously at least one of the images overlies the reflective region.

Advantageously the print instructions for the security image are stored in a memory device. The memory device may, for example, be implemented in the form of a removable memory card, a dongle, a smart card or other equivalent removable memory element. The security image may be held in an encrypted form and local processing may also be provided such that the encrypted image cannot be accessed without a suitable key. The key may, for example, be available to authorise users on a time limited fashion such that once the key expires the security image can no longer be printed. Replacement keys may be obtained via a telecommunications network, for example over the internet, or by distribution of suitably encoded disks or by passwords. Alternatively the printer itself may act as the key to read the data from the memory element.

The printer may have a data processor arranged such that the printer negotiates with the memory element to obtain the security image therefrom. The security image may be in an encrypted form. The encrypted form may differ every time the image is read from the memory device. The data processor in the printer is arranged to decrypt the image.

According to a second aspect of the present invention, there is provided a security product printed in accordance with the first aspect.

Advantageously the security product is one of a bank card, a credit card, and a security card.

It is thus possible to provide a security card comprising a plastics substrate bearing on at least one portion thereof a reflective element, and a plastics layer deposited over the substrate and the reflective element, the optical properties of the plastics layer being altered in at least the region overlying the reflective element in order to form a visible marking therein.

Advantageously the substrate is printed with identification details, such as words, pictures or other indicia. The printing may be performed by dye sublimation printing. Following the printing step, the protective layer is then deposited on the card, with the simultaneous formation of security images in the protective layer. The protective layer may be applied to the card by thermal transfer.

The present invention will further be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a cross-section of a thermal array print head as used according to the present invention;

Figure 2 illustrates how the print head of Figure 1 prints an image by depositing pigment on a receiver surface;

Figure 3 is a cross section of a printed receiver surface of Figure 2 with a protective plastics film coating applied to it and incorporating a texture image therein:

Figure 4 is a plan view of a security card constituting an embodiment of the present invention; and

Figure 5 schematically illustrates a printer for printing a card according to the present invention.

As shown in Figures 1 and 2, a thermal print head 1 is in intimate contact with a carrier film 2 on which a pigment 3 on the surface thereof is pressed against a receiver layer 4. The receiver layer acts as a substrate. The carrier film 2 and the receiver layer 4 are moved together relative to the print head 1. In use, heater elements 5 aligned along the print head are selectively energised by electrical pulses to transfer dots or pixels 6 of pigment to the receiver layer 4 in successive lateral rows across the width of the receiver layer.

The receiver layer is provided, at least in part, with one or more reflective areas formed by bonding or otherwise depositing a shiny, and preferably metallic, film to the surface of the receiver layer 4. The reflective region is designated 8 in Figures 3 and 4. The reflective layer 8 may be deposited in a printing step prior to the printing of the pixels of ink, or may be provided as part of the receiver layer, for example during its manufacture.

During a subsequent plastics coating process, which could involve the same print head 1 or a similar print head, a coating of clear plastics material 7 is transferred onto the receiver layer 4, thereby overlaying the pigment layer 6 and the reflective layer 8.

The clear plastics material may be carried on a carrier film which passes beneath the print head with the receiver layer 4 in a similar manner to that described with reference to Figure 2. Again the heater elements of the print head are selectively energised to transfer pixels or dots of the plastics material 7 to the receiver layer 4 in a continuous manner so that the whole of the pigment layer 6 and the reflective element 8 are coated.

The heater elements 5 may be selectively energised so as to transfer varying thicknesses of the plastics layer to the receiver layer 4. However, in a preferred embodiment, the heater elements are energised so as to transfer the whole thickness of the carrier film to the receiver layer 4, with selected areas 10 being heated to a greater amount. The additional heating overworks the clear plastics layer and modifies its shiny upper surface thereby creating regions 10 which are not shiny and which have a matt or satin like appearance. Thus a uniformly thick protective layer bearing an image can be deposited onto to receiver layer and images printed thereon.

The applicant has found that, unexpectedly, those images printed over the reflective element 8 are clearly visible even in diffuse light and this enhances the usefulness and visibility of the security image.

Figure 4 schematically illustrates a security card constituting an embodiment of the present invention. In plan view, various images 12, 14 and 16 are formed in the plastics layer 7. The image 12 overlying the reflective element 8 is clearly visible, whereas the images 14 and 16 not overlying the reflective layer 8 are more faint. The image 16 overlies a printed area 18 with a text or other image formed in the area 18 being visible through the security image 16.

Figure 5 illustrates a printer for printing identity or other secure cards.

The instructions for encoding the security image may be encoded within a removable encryption processor and memory element 20, which may, for example, be a compact flash package removable from or introducable into a suitable reader 22 in a card or other printer 24.

It is thus possible to provide an improved security printing method and an improved security card. In testing, blank cards with the reflective patch 8 preformed thereon were obtained from Bristol Business Cards of Bristol, England.

CLAIMS

1. A method of forming an image, comprising providing a layer of plastics material over a substrate, the substrate having at least one reflective region thereon, and selectively altering the optical properties of portions of the plastics material so as to form an image therein.
2. A method as claimed in claim 1, wherein the at least one reflective region comprises a metal film.
3. A method as claimed in claim 2, wherein the metal film is printed onto the substrate.
4. A method as claimed in claim 3, in which the metal film is provided on a carrier film and is brought into contact with the substrate at a printing station and transferred to the substrate.
5. A method as claimed in claim 1, wherein the layer of plastics material is provided on a carrier film and in which a plurality of heater elements are provided on a thermal print head, and in which the heater elements are energised when the carrier film is in contact with the substrate to transfer the plastics material to the substrate.
6. A method as claimed in claim 5, in which the heating elements are energised to deposit a continuous layer of the plastics material over the whole of the area to be covered such that the plastics material serves as a protective coating.
7. A method as claimed in claim 6, in which selected regions of the plastics material are heated to a greater degree than other areas so as to vary the surface appearance of the plastics layer.
8. A method as claimed in claim 7, in which the full thickness of the plastics film is deposited and selected portions thereof are overheated so as to give these portions a different appearance.

9. A method as claimed in claim 8, in which the overheated portions have a satin appearance.
10. A method as claimed in claim 8, in which the overheated portions have a matt appearance.
11. A method as claimed in claim 1, in which the image is printed over the substrate in a repeating pattern.
12. A method as claimed in claim 1, in which the layer of plastics material is deposited on the substrate during a printing process, and in which the image to be formed in the plastics film is held in a memory device readable by one of the printer and a data processor controlling the printer.
13. A method as claimed in claim 12, in which the memory device is a removable device.
14. A method as claimed in claim 12, in which the image is held in an encrypted form.
15. A surface printed in accordance with the method of claim 1.
16. A printed item, said item having a substrate bearing on at least a portion thereof a reflective element and a plastics layer deposited over the substrate and the reflective element, the optical properties of the plastics layer altered in at least the region overlying the reflective element.
17. A printed item as claimed in claim 16, in which the plastics layer is deposited as a substantially uniform layer.
18. A printed item as claimed in claim 17, in which portions of the plastics layer are overheated in order to change the appearance of those portions.

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19. A printed item as claimed in claim 16, in which the item is an identity card.
20. A printed item as claimed in claim 16, in which the item is one of a security card, bank card, licence and credit card.

ABSTRACTA METHOD OF FORMING AN IMAGE, AND TO A PRODUCT HAVING AN IMAGE FORMED THEREON

(FIGURE 3)

A security card is provided in which an ink region 6 bearing image or textural data is printed onto a substrate 4. A reflective portion 8 is also provided on the substrate 4. A plastics protective layer 7 is deposited over the ink 6 and reflective element 8. Portions 10 of the protective layer 7 are overworked in order to change their appearance. Those portions overlying the reflective element 8 exhibit enhanced visibility

00000000000000000000000000000000

Fig 1

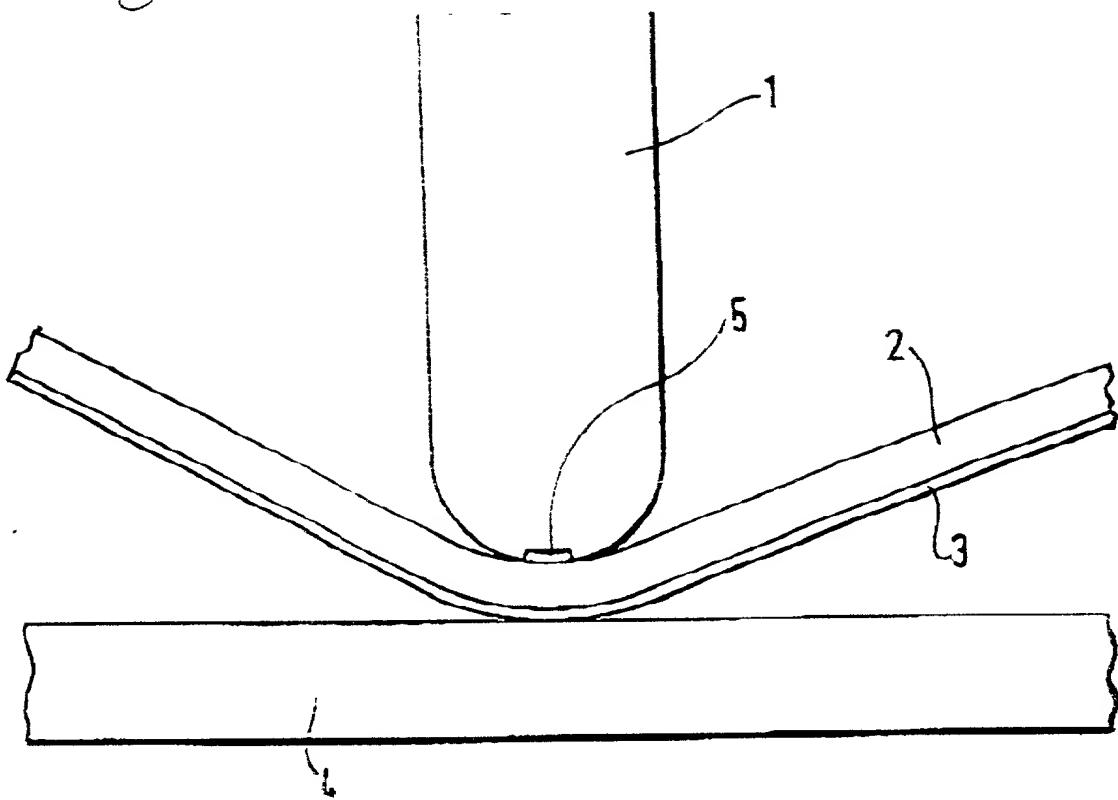
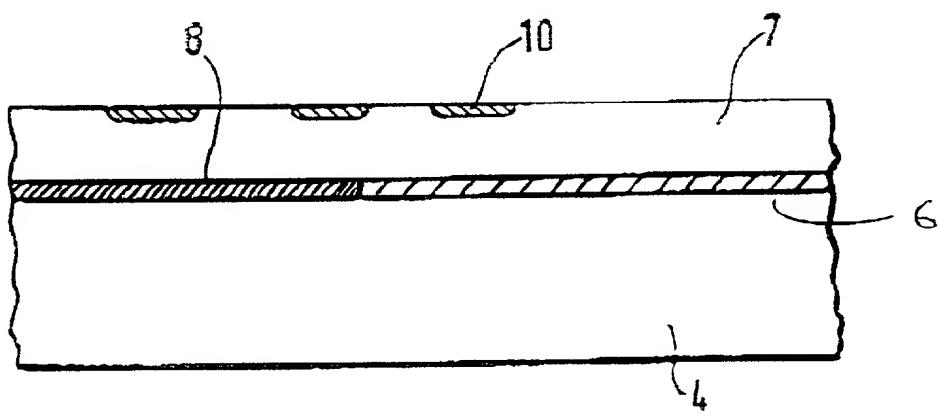


Fig 3



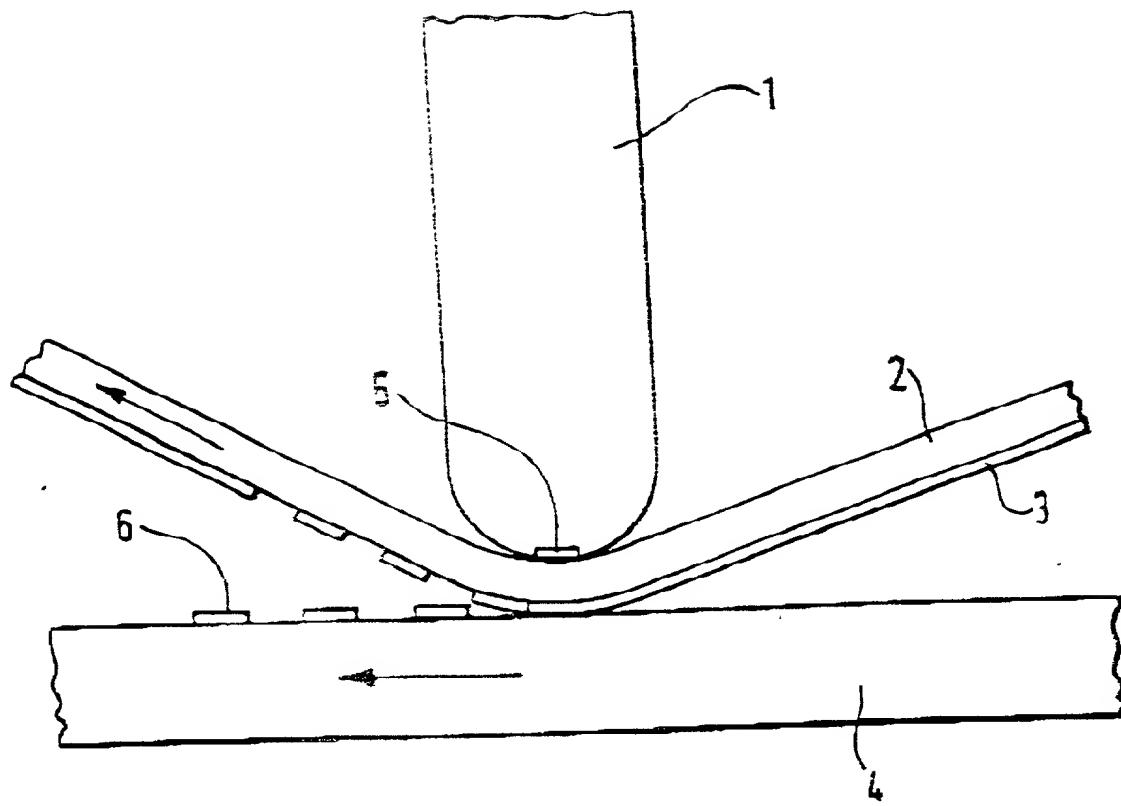


FIG.2.

Fig 4

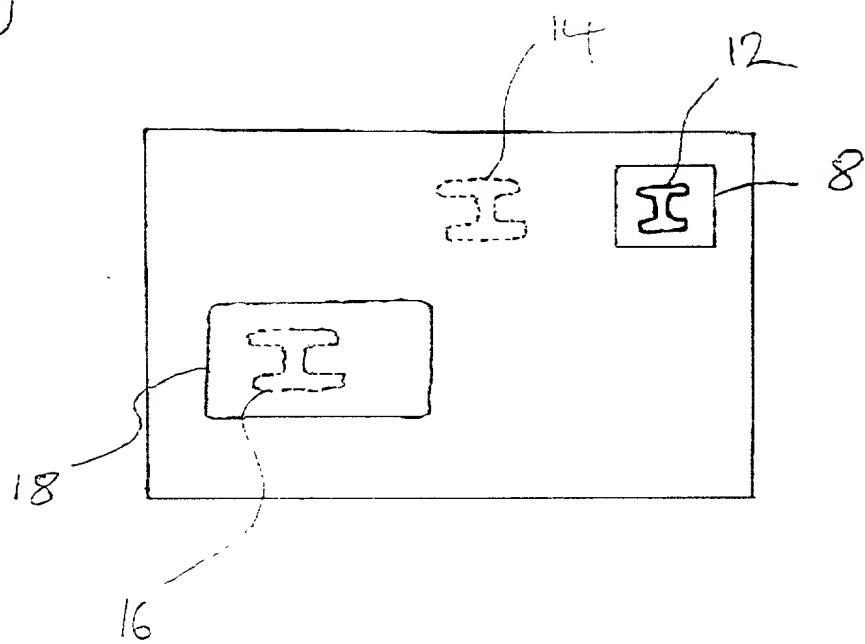
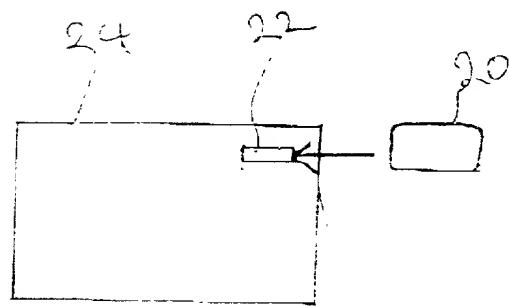


Fig 5



**COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY**

(Includes Reference to PCT International Applications)

ATTORNEY DOCKET NUMBER

ULTRA-1001

As a below named inventor, I (we) hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

A METHOD OF FORMING AN IMAGE, AND TO A PRODUCT HAVING AN IMAGE FORMED THEREON.

the specification of which (check only one item below):

- is attached hereto  
 was filed as United States application

Serial No. \_\_\_\_\_

on \_\_\_\_\_

and was amended

on \_\_\_\_\_ (if applicable)

 was filed as PCT international application

Number \_\_\_\_\_

on \_\_\_\_\_

and was amended under PCT Article 19

on \_\_\_\_\_ (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 or §356 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America, listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

## PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

| COUNTRY<br>(If PCT, indicate "PCT") | APPLICATION NUMBER | DATE OF FILING<br>(day, month, year) | PRIORITY CLAIMED<br>UNDER 35 USC 119 |                             |
|-------------------------------------|--------------------|--------------------------------------|--------------------------------------|-----------------------------|
|                                     |                    |                                      | <input type="checkbox"/> YES         | <input type="checkbox"/> NO |
|                                     |                    |                                      | <input type="checkbox"/> YES         | <input type="checkbox"/> NO |
|                                     |                    |                                      | <input type="checkbox"/> YES         | <input type="checkbox"/> NO |
|                                     |                    |                                      | <input type="checkbox"/> YES         | <input type="checkbox"/> NO |
|                                     |                    |                                      | <input type="checkbox"/> YES         | <input type="checkbox"/> NO |
|                                     |                    |                                      | <input type="checkbox"/> YES         | <input type="checkbox"/> NO |
|                                     |                    |                                      | <input type="checkbox"/> YES         | <input type="checkbox"/> NO |

Combined Declaration For Patent Application and Power of Attorney (Continued)  
(Includes Reference to PCT International Applications)

ATTORNEY DOCKET NUMBER  
ULTRA-1001

I hereby claim the benefit under Title 35, United States Code §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations §1.56 which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

| U.S. APPLICATIONS                     |                  | STATUS (Check one)                    |         |           |
|---------------------------------------|------------------|---------------------------------------|---------|-----------|
| U.S. APPLICATION NUMBER               | U.S. FILING DATE | PATENTED                              | PENDING | ABANDONED |
|                                       |                  |                                       |         |           |
|                                       |                  |                                       |         |           |
|                                       |                  |                                       |         |           |
| PCT APPLICATIONS DESIGNATING THE U.S. |                  |                                       |         |           |
| PCT APPLICATION NO.                   | PCT FILING DATE  | U.S. SERIAL NUMBERS ASSIGNED (if any) |         |           |
|                                       |                  |                                       |         |           |
|                                       |                  |                                       |         |           |
|                                       |                  |                                       |         |           |

**POWER OF ATTORNEY:** As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: MITCHELL P. BROOK, Reg. No. 32,967, DAVID I. ROCHE, Reg. No. 30,767, ANTONETTE F. KONSKI, Reg. No. 34,202, JOHN G. FLAIM, Reg. No. 37,323, WILLIAM J. KOLEGRAFF, Reg. No. 41,125, MOSES MARES, Reg. No. 40,716; all attorneys with the firm of BAKER & MCKENZIE, which has an office address at 101 West Broadway, San Diego, CA 92101-3890.

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|---------------------|-------------------------|--------------------------|--------------------------|------------------------|
| 2<br>0<br>1         | FULL NAME OF INVENTOR   | FAMILY NAME              | FIRST GIVEN NAME         | SECOND GIVEN NAME      |
|                     | COLES                   | RAYMOND                  | W.                       |                        |
|                     | RESIDENCE & CITIZENSHIP | CITY                     | STATE OR FOREIGN COUNTRY | COUNTRY OF CITIZENSHIP |
| WEYMOUTH            | ENGLAND                 | UNITED KINGDOM           |                          |                        |
| 2<br>0<br>2         | POST OFFICE ADDRESS     | CITY                     | STATE & ZIP CODE/COUNTRY |                        |
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| POST OFFICE ADDRESS | CITY                    | STATE & ZIP CODE/COUNTRY |                          |                        |

Additional inventors are being named on the \_\_\_\_\_ supplemental Additional Inventor(s) sheet(s) attached hereto.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201

SIGNATURE OF INVENTOR 202

DATE 28th Sept 01 - 2000.

DATE